Short Communications

*Indian Journal of Animal Sciences* **85** (2): 148–150, February 2015/Short communication

# Prevalence of oesophagostomosis in goats in humid North-East Himalayan region Sikkim, India

PAPRI PAL[1], L R CHATLOD[2], B KUMAR[3] and R K AVASTHE[4]

*ICAR Research Complex for North Eastern Hill Region, Sikkim Centre, Tadong, Gangtok, Sikkim 737 102 India*

Received: 22 September 2014; Accepted: 8 October 2014

**Key words**: Goats, *Oesophagostomum* spp., Prevalence, Sikkim

In many areas of India, raising of livestock is an important economic activity from which food and cash income are derived. Economic losses due to oesophagostomosis are attributed to morbidity, mortality and cost of medication (Biu *et al.* 2012, Lamrioui *et al.* 2013). There is paucity of information on the disease oesophagostomosis in goats except a preliminary report on prevalence of gastrointestinal nematodiasis in goats in Sikkim (Rahman *et al.* 2012, Pal *et al.* 2013). Hence, this investigation was conducted to determine the prevalence of oesophagostomosis in 4 agroclimatic zones of Sikkim with a view to proffer feasible preventive and control measures.

Faecal samples of 9,480 goats of both sexes and different ages in 4 districts of Sikkim were collected randomly from 13 villages of 4 agroclimatic zones of the state between April 2007 and March 2012, and subjected to qualitative and quantitative examinations of *Oesophagostomum* spp *(*Soulsby 1982) and the parasites were identified by examining the eggs and culturing for larvae *(*Soulsby 1982). Faecal egg count (eggs per gram of faeces, EPG) of nematode eggs was determined by modified McMaster technique (MAFF 1984). Seasonal prevalence was studied throughout the year dividing into 4 seasons, spring (Mar-May), summer (June-Aug), autumn (Sep-Nov) and winter (Dec-Feb).

The present study revealed that out of 9,480 animals tested from 4 agroclimatic zones of Sikkim, 2,950 (31.12 %) were positive for *Oesophagostomum* spp. (Table 1). The occurrence of *Oesophagostomum* spp. was higher (35.42 %) among animals reared at a lower altitude subtropical high humid zone (<1,600 m amsl) followed by temperate humid zone (< 3,000 m amsl, 28.63 %) than those reared at higher altitude alpine dry humid zone (7.14 %, 4286 m amsl). An overall low rate of infection with *Oesophagostomum* spp. in goats recorded in the alpine dry area might be due to non-conducive agroclimatic conditions prevailing in these selected areas of study which does not favour the propagation of the parasitic ova thus leading to unavailability of infective larvae on the grazing ground (Rahman *et al.* 2012, Pal *et al.* 2013). The monthly mean EPG of *Oesophagostomum* spp. in goats during the study is shown in Fig. 1. The occurrence of *Oesophagostomum* spp. was high throughout the period of study with a high peak during July to September. With the onset of winter (Table 2) from December onwards, the mean

Table 1. Agroclimatic zone-wise prevalence of oesophagostomosis in different district of Sikkim

| District | Subtropical and high humid zone | | Temperate humid zone | | Sub-alpine low humid zone | | Alpine dry zone | | Overall | |
|---|---|---|---|---|---|---|---|---|---|---|
| | No. of animals examined | No. of infected animals (%) | No.of animals examined | No.of infected animals (%) | No. of animals examined | No.of infected animals (%) | No. of animals examind | No. of infected animals (%) | No. of animals examined | No.of infected animals (%) |
| East | 2245 | 817(36.39) | 2806 | 845(30.04) | 133 | 21 (15.79) | 86 | 8(9.31) | 5270 | 1691 (32.09) |
| West | 629 | 273(43.40) | 381 | 87 (22.83) | - | - | - | - | 1010 | 360 (35.64) |
| North | 398 | 111(27.89) | 450 | 105 (23.33) | 98 | 8(8.16) | 68 | 3(4.41) | 1014 | 227 (22.39) |
| South | 1206 | 385(31.92) | 988 | 287 (29.05) | - | - | - | - | 2194 | 672 (30.63) |
| Total | 4478 | 1586(35.42) | 4625 | 1324 (28.63) | 223 | 29 (13.01) | 154 | 11 (7.14) | 9480 | 2950 (31.12) |

Present address: [1]Research Associate (drpapripaldutta @gmail.com), Division of Animal Health, [3]Scientist (drbrijeshvet02@gmail.com), Animal Production, [4]Joint Director (jdsikkim.icar@gmail.com). [2]Scientist (VPH) (chatlodlaxman @rediffmail.com), National Research Centre on Meat, Chengicherla, P.O.Box No. 19, Boduppal, Hyderabad.

Table 2. Prevalence of oesophagostomosis relative to the seasons and the animals age and sex

| Variable | Category | Number of animals examined | Number of infected animals | Infection rate (%) | EPG category (%) | | |
|---|---|---|---|---|---|---|---|
| | | | | | Low | Moderate | Severe |
| Season | | | | | | | |
| | Spring (Mar-May) | 2304 | 604 | 26.21 | 126(5.76) | 478(20.75) | – |
| | Summer (June-Aug) | 2520 | 982 | 38.97 | 289 (11.47) | 623 (24.72) | 51 (2.02) |
| | Autumn (Sep-Nov) | 2366 | 885 | 37.41 | 721 (30.47) | 101 (4.27) | 63 (2.66) |
| | Winter (Dec-Feb) | 2290 | 479 | 20.92 | 87 (3.81) | 392 (17.11) | – |
| | Total | 9480 | 2950 | 31.12 | 1136 (11.98) | 1594 (16.81) | 114 (1.21) |
| Age | | | | | | | |
| | Growing goats (6–12 months) | 553 | 91 | 16.46 | 53 (9.58) | 31 (5.61) | 07 (1.27) |
| | Young goats (12–24 months) | 2269 | 628 | 27.68 | 168 (7.41) | 387 (17.06) | 73 (3.22) |
| | Older goats (>24 months) | 6658 | 2231 | 33.51 | 226 (3.39) | 701 (10.53) | 1304 (19.56) |
| | Total | 9480 | 2950 | 31.12 | 447 (4.72) | 1119 (11.81) | 1384 (14.6) |
| Sex | | | | | | | |
| | Female | 4993 | 1855 | 37.15 | 304 (6.09) | 988 (19.79) | 563 (11.28) |
| | Male | 4487 | 1095 | 24.40 | 366 (8.16) | 628 (14.01) | 101 (2.25) |
| Total | Total | 9480 | 2950 | 31.12 | 670 (7.07) | 1616 (17.05) | 664 (7.01) |

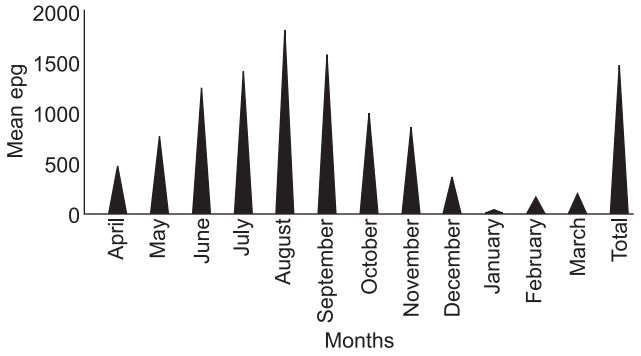


Fig. 1. Egg counts (mean epg) of *Oesophagostomum* spp. in goats (averaged over five years, 2007–2012).

total egg count fell to a low level, steadily falling to a minimum of 35.246 EPG in January after that it rose slowly with the increase in temperature and rainfall. Greater proportion of study animals were with moderate (16.81%) to low (11.98%) EPG while fewer were with severe ( 1.21%) infection rates (Table 2).

Mean EPG level served an index of the intensity of worm burden in animals and helps in devising management strategies besides assessing the efficacy of control programmes and keeping track of development of anthelminthic resistance (Yadav *et al.* 2008). The higher prevalence and degree of EPG in summer and autumn seasons as compared to other seasons may be due to the differences in grazing patterns of the animals in the areas under study. The rise in *Oesophagostomum* EPG could be attributed to more favourable temperature and humidity for the development and survival of the preparasitic stages leading to increased availability of infective larvae on the pasture during the subsequent months. This result was in accordance with Jithendran and Bhat (1999) in dairy animals in the North West Humid Himalayan region of India, Rahman *et al.* (2012) and Pal *et al.* (2013) from Sikkim, Singh *et al.* (2005) in sheep in Ludhiana, Yadav *et al.* (2008) from high altitudes of Uttarakhand, Sharma *et al.* (2007) in gaddi sheep in Palam valley of North Western Himalayan region of India. The present study indicated a higher prevalence in summer (38.97%) followed by autumn (37.41%) and spring (26.21%). The infection rate was significantly ($P<0.05$) lower in winter (17.11 %). Our results revealed a fairly clear seasonal variation with high levels of infection during summer/rainy season, which was consistent with the observations of Nwosu *et al.* (2012) and Salifou *et al.* (2013). The study also indicated that under normal conditions the animals harboured a worm burden without any clinical signs but the worm burden reached a threshold pathogenic level during the monsoon and post-monsoon seasons (Rahman *et al.* 2012).

In this study, age had a significant association with the prevalence of *Oesophagostomum* spp. The highest prevalence (33.51%) was recorded in older animals (>24 months) with moderate (10.53%) to severe (19.56%) EPG, followed by 27.68% in young animals (12–24 months) and the lowest (16.46%) in growing animals of 6–12 months old (Table 2). This result was in agreement with Yadav *et al.* (2008), Rahman *et al.* (2012) and Salifou *et al.* (2013) from different places of India and Northern Benin. Besides, higher prevalence in older groups may be due to more exposure to the source of infection. These animals may acquire immunity to the parasites through frequent challenge and expel the ingested parasite before they establish infection. This study revealed a relatively higher prevalence in females (37.15%) than males (24.40%). The higher percentage of infection in the females may be due to the alteration in the physiological condition of the animals during pregnancy and lactation (production activity) and also the lack of feed supplement for production which may lead to the lowering of body resistance of the female.

The data generated in this study indicated that under prevailing agroclimatic conditions of Sikkim, India, the prevalence of *Oesophagostomum* spp. is slightly high

among goats. However, the EPG estimated in the present study indicated the level of sub-clinical infections in the host species and may initially be of help in planning chemotherapeutic and prophylactic strategies for goats from an area studied and also of the regions with similar climatic conditions. Further, investigation on epizootiology of *Oesophagostomum* spp. in goats in different agroclimatic regions, larval bionomics and pasture burden are required for better understanding of oesophagostomosis in the region.

## SUMMARY

In the study 9,480 goats were included using standard parasitological procedure in 13 villages of Sikkim during April 2007 to March 2012. The overall infection rate was 31.12 % with a mean number of eggs per gram of faeces (EPG) as 1450.55. The prevalence was found relatively higher in subtropical high humid area (35.42%) compared to temperate humid zone (28.63%), sub-alpine low humid zone (13.01%) and alpine dry zone (7.14%). Highest infection rate was observed during summer (11.21%) followed by autumn (9.12%) and spring (6.56%). The infection rate was significantly ( $P<0.05$) lower in winter season (4.23%). Age-wise prevalence was 6.09, 10.22, and 14.81% in the animals below 1 year, within 1–2 year and above 2 years of age, respectively. The females were found more (37.15%) susceptible to *Oesophagostomum* spp. infections than the males (24.40%). Year-wise prevalence of these species was also recorded.

## ACKONWLEDGEMENTS

The authors are thankful to the Department of Agricultural Research and Education, Government of India for financial assistance under AINP on GIP. Thanks are also expressed to the Director and Joint Director, ICAR Research Complex for NEH Region, Sikkim Centre, Gangtok for providing the necessary facilities.

## REFERENCES

Biu A A, Paul B T, Konto M and Yauba A M. 2012. Cross sectional studies on oesophagostomosis in slaughter cattle in Maiduguri, Nigeria. *Journal of Agriculture and Veterinary Sciences* **4** (12): 22–27.

Jithendran K P and Bhat T K. 1999. Epidemiology of parasitoses in dairy animals in the North- West Humid Himalayan region of India with particular reference to gastrointestinal nematodes. *Tropical Animal Health and Production* 31: 205–14.

Lamrioul D, Hassouni T, Belghyti D, Mostafi J, Madhi Y E and Lamri D. 2013. Prevalence and intensity of intestinal nematodes in goat (*Capra hircus*) from oriental region, Province of Figuig, Morocco. *International Journal of Agricultural Science Research* **2** (9): 279–82.

MAFF 1984 . *Manual of Veterinary Investigation*. Vol.2, (Reference Book 390, HMSO, London), 161–187.Techniques. HMSO.

Nwosu C O, Okon E D, Chiejina S N, Igbokwe I O, Mbaya A W, Columbus P K, Chagwa L L and Daniel-Igwe G. 2012. Natural *Oesophagostomum columbianum* infection of Sahel goats in northeastern Nigeria. *Comparative Clinical Pathology* 8pp.

Pal P, Chatlod L R, Avasthe R K and Prasad A. 2013. Gastrointestinal helminthes of goats in a subtropical and high humid zone of Sikkim, India. *Ruminant Science* **2** (12): 149–53.

Rahman H, Pal P, Bandyopadhyay S and Chatlod L R. 2012. Epidemiology of gastrointestinal parasitism in goats in Sikkim. *Indian Journal of Animal Sciences* **82** (4): 355–58.

Salifou S, Daga D F, and Attindehou S. 2013. Prevalence and intensity of nodular oesophagostomosis in West African long legged goats in Northern Benin. *Journal of Parasitology and Vector Biology* **5** (2): 17–19.

Soulsby E J L. 1982. *Helminths*, *Arthropods and Protozoa of Domesticated Animals*. 7th edn, 809 pp. ELBS and Baillire, Tindall, London.

Yadav C L, Kumar R R, Vatsya S, Garg R and Barneerjee P S. 2008. Epidemiological studies on gastrointestinal nematodiasis in cattle and buffaloes. *Journal of Veterinary Parasitology* **22** (1): 49–52.